

缓倾坡内层状岩质高边坡稳定性分析——以黄桷湾危岩高边坡的主斜坡为例

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STABILITY ANALYSIS OF HIGH ROCK SLOPE WITH GENTLE BEDDING DIP AT HUANG JUEWAN

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全文: PDF (1986 KB) HTML (KB) 输出: BibTeX | EndNote (RIS) 背景资料

摘要 黄桷湾危岩高边坡是泥岩和砂岩呈类似“夹心饼干”状软硬互层结构、缓倾坡内的岩质高切坡。危岩高边坡除坡顶的陡崖处厚层砂岩发生崩塌失稳外,主斜坡体下部还存在局部的切层失稳。为确保高边坡下部的工程建设的顺利开展和居民的安全,采用数值模拟的方法对高边坡的主斜坡进行稳定性评价,选取天然自重和地震动荷载两种工况进行分析。计算结果表明:(1)主斜坡岩体在两种工况下仍处于稳定状态,但在地震动荷载作用下稳定系数下降显著;(2)陡崖和主斜坡接触带附近及主斜坡坡脚处应力集中现象明显,发生破坏的可能性更大;(3)主斜坡潜在滑移面位于坡内中深部,剪出口位置可能位于主斜坡的坡脚处。

关键词: 高切坡 缓倾坡内 数值模拟 稳定性分析

Abstract: Huang Juewan high-steep rock slope is composed by mudstone and sandstone. The rock beddings are similar to the "cookies". They have soft and hard layers with gentle dip layered structure. The high-steep slope in addition to the top of the steep cliff in thick sandstone occurred collapses. Outside the instability main slope body bottom, there are local cutting layer instability. To ensure a smooth start of the lower part of high slope and the safety of the residents, this paper uses the method of numerical simulation on the high slope of the stability evaluation. The paper selects the natural dignity and seismicity load as the two conditions for slope stability analysis. The results show that: (1) Main slope rock mass in the two kinds of working conditions is still in the stable state; but seismic loads slope stability reduced significantly influence; (2) Steep cliff and main slope near the contact zone and the ramp slope foot place obvious stress concentration phenomenon more likely to damage; (3) the potential sliding surface of slope is located in the central slope. The cut points may be located at the slope toe.

Key words: High-steep rock slope Gentle dip bedding Numerical simulation Stability analysis

收稿日期: 2013-01-20;

基金资助:

国家自然科学基金-云南联合基金重点项目(U1033601); 国家自然科学基金项目(4057215940772189)资助

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引用本文:

. 缓倾坡内层状岩质高边坡稳定性分析——以黄桷湾危岩高边坡的主斜坡为例[J]. 工程地质学报, 2013, 21(4): 619-625.

. STABILITY ANALYSIS OF HIGH ROCK SLOPE WITH GENTLE BEDDING DIP AT HUANG JUEWAN[J]. Journal of Engineering Geology, 2013, 21(4): 619-625.

[1] 董金玉, 伍法权, 等. 三峡库区软硬互层近水平地层高切坡崩塌研究[J]. 岩土力学, 2010, 31(1): 151~156.

Dong Jinyu, Wu Faquan, et al. Research on collapse of high cutting slope with horizontal soft-hard alternant strata in Three Gorges Reservoir area. Rock and soil Mechanics, 2010, 31(1): 151~156.

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- [2] 肖先焯,夏克勤,许模.三峡库区某滑坡稳定性模型试验研[J].工程地质学报, 2013,21(1): 45~52. 浏览
- Xiao Xianxuan, Xia Keqin, Xu Mo. Stability of landslide on Three-gorges dam reservoir with physical simulation on model. Journal of Engineering Geology, 2013,21(1): 45~52. 浏览
- [3] 董好刚,彭明轩,等.缓倾层状高切坡典型破坏模式及宏观判据研究[J].长江科学院院报, 2009,26(8): 36~41.
- Dong Haogang, Peng Mingxuan, et al. Typical failure modes and identification of low-angled stratofabric rock slope. Journal of Yangtze River Scientific Research Institute, 2009,26(8): 36~41.
- [4] 沈强,陈从新,等.三峡库区水平层状边坡稳定性分析[J].岩土力学, 2005,26(增): 16~20.
- [5] Shen Qiang, Chen Congxin, et al. Study on stability of horizontal bedded rocky slopes in Three Gorges Reservoir area. Rock and Soil Mechanics, 2005,26(S): 16~20.
- [6] 祝介旺,伍法权,苏天明.三峡库区万州段高切坡破坏模式和防护措施研究[J].工程地质学报, 2007,15(1): 8~16. 浏览
- Zhu Jiewang, Wu Faquan, Su Tianming. Failure modes and stabilization methods of highly incised slopes in Wanzhou mountainous region Three Gorges Reservoir. Journal of Engineering Geology, 2007,15(1): 8~16. 浏览
- [7] Zhao Xiao, et al. Study on failure model and stability of one tangential slope. Journal of Geological Hazards and Environment Preservation 2006,(3): 110~115.
- [8] Wang Gongxian, Ma Huimin. The 100 Examples of Landslide Control. Beijing: People's Communications Publishing House, 2008.
- [9] Kunming Prospecting Design Institute of China Nonferrous Metals Industry. Geological Disaster Prevention Project Survey and Design. Kunming: 2011.
- [10] Zhang Zhuoyuan, Wang Shitian, Huang Runqiu, et al. The Principle of Engineering Geological Analysis. Beijing: Geological Publishing House 2009.
- [11] 林杭,曹平,等.层状岩质边坡破坏模式及稳定性数值分析[J].岩土力学, 2010,31(10): 3300~3304.
- Lin Hang, Cao Ping, et al. Numerical analysis of failure modes and stability of stratified rock slopes. Rock and Soil Mechanics, 2010,31(10): 3300~3304.
- [12] 李果,黄润秋,巨能攀.软弱基座型滑坡震裂机理研究[J].工程地质学报, 2011,19(5): 712~718. 浏览
- Li Guo, Huang Runqiu, Ju Nengpan. Earthquake cracking mechanism of landslide with soft foundation. Journal of Engineering Geology, 2011,19(5): 712~718. 浏览
- [13] 赵彪,陈洪凯.边坡地震稳定性完全动力分析法[J].重庆交通大学学报, 2011,30(1): 580~583.
- Zhao Biao, Chen Hongkai. Fully dynamic analysis method for seismic stability of slope. Journal of Chongqing Jiaotong University, 2011,30(1): 580~583.
- [14] 黄诚,王安明,任伟中.水平向与竖直向地震动的时遇模式对边坡动力安全系数的影响[J].岩土力学, 2010,31(11): 3404~3410.
- Huang Cheng, Wang Anming, Ren Weizhong. Influence of time combination pattern of horizontal and vertical ground motions on slope seismic safety factor. Rock and Soil Mechanics, 2010,31(11): 3404~3410.
- [15] 汪茜.地震作用下顺层岩质边坡变形破坏机理研究[D].长春:吉林大学, 2010.
- [16] Wang Qian. Study on Deformation Characteristics and Failure Mechanism of Bedding Rock Slope under Earthquake. Changchun: JinLin University, 2010.
- [17] 高德军,徐卫亚,等.长江三峡大石板滑坡计算参数反分析[J].河海大学学报(自然科学版), 2006,34(1): 74~78.
- Gao Dejun, Xu Weiya, et al. Back analysis of calculation parameters for Dashiban landslide at Three-Gorges Reservoir on Yangtze river. Journal of Hohai University(Nature Sciences), 2006,34(1): 74~78.
- [18] Chen Yumin, Xu Dingping. FLAC/FLAC^{3D} Foundation and Engineering Examples. Beijing: China Water Conservancy and Hydropower Press, 2008.
- [19] Liu Bo, Han Yanhui. The Principle of FLAC, Instances and Application Guide. Beijing: People's Communications Publishing House, 2005.
- [20] Huang Runqiu. Geodynamical process and stability control of high rock slope development. Chinese Journal of Rock Mechanics and Engineering, 2008,(8): 1~20.
- [21] 范文,俞茂宏,李同录,等.层状岩体边坡变形破坏模式及滑坡稳定性分析[J].岩石力学与工程学报, 2000,19(增): 983~986.
- [22] Fan Wen, Yu Maohong, Li Tonglu, et al. Failure pattern and numerical simulation of landslide stratified rock. Chinese Journal of Rock Mechanics and Engineering, 2000,19(S): 983~986.
- [23] 郑颖人,叶海林,黄润秋.地震边坡破坏机制及破坏面的分析探讨[J].岩石力学与工程学报, 2009,28(8): 1714~1723.
- Zheng Yingren, Ye Hailin, Huang Runqiu. Analysis and discussion of failure mechanism and fracture surface of slope under earthquake. Chinese Journal of Rock Mechanics and Engineering, 2009,28(8): 1714~1723.
- [1] 王定伟,伍法权,马艾阳.腊寨水电站坝址右岸边坡三维数值模拟分析[J].工程地质学报, 2013, 21(4): 641-648.
- [2] 吴泊人,游昆骏,潘国林,巨能攀,赵建军.皖南山区阳台古滑坡形成机制研究[J].工程地质学报, 2013, 21(2): 304-310.
- [3] 杨福麟,刘永林,胡斌.武汉地铁隧道开挖引起地表沉降的数值模拟研究[J].工程地质学报, 2013, 21(1): 85-91.

[4] 邓东平, 李亮. 适用于任意滑动面的边坡稳定性分析辐射条分法[J]. 工程地质学报, 2012, 20(6): 916-925.